# SCIAPHILA DOLICHOSTYLA (TRIURIDACEAE)

PETER S. GREEN AND OTTO T. SOLBRIG

ONE OF THE BEST WAYS to find small and insignificant plants is to look around as one sits down to eat lunch in the field. In just this way one of us (P.S.G.) noticed a small, red saprophyte, which was later identified as *Sciaphila dolichostyla* Schltr., growing in rich humus on the bank of a stream in New Caledonia.*

Unfortunately, full ecological notes were not made at the time, but bud material was fixed in acetic-alcohol and flown, by mail to Cambridge, Massachusetts, where one of us (O.T.S.) carried out the cytological examination reported upon below.

The Triuridaceae is a small family of saprophytic, monocotyledonous herbs, containing 7 genera and 70 or more species. It is confined to the tropics of both the New and Old Worlds, with the greatest concentration of species in southwest Asia, including the East Indies and New Guinea. The largest genus is *Sciaphila*, with about 50 species, while two of the genera are monotypic. The flowers are actinomorphic and apocarpous, with valvate perianth lobes usually in multiples of three. In some species the flowers are unisexual, in others hermaphrodite. As saprophytes, the plants contain no chlorophyll and are generally reported as being reddish, purplish or yellow in color. Endogenous mycorrhizae have been described by Larsen (1963), together with references to earlier reports.

The *Sciaphila* reported upon in this note (*P. S. Green 1329*), was growing on a fairly steep, earthy bank with patches rich in humus, and below a relatively light canopy of low to medium-sized trees fringing the Nekoroya, a rocky tributary stream of the Rivière Téné, near Bourail on the southern side of the central mountain chain and somewhat less than 150 km. northeast of Nouméa. Except for the woodland fringing the streams, the general area was one of "maquis," at an approximate altitude of 150 meters, where lateritic soils overlay the serpentines and peridotites so characteristic of much of New Caledonia.

The shoots of *Sciaphila*, approximately 5 to 12 centimeters high above the surface of the humus and leaf litter (FIG. 1, A & B), were red throughout with no sign of chlorophyll. The underground rhizome was very thin and brittle and appeared to branch and ramify throughout the humus, giving off numerous small, twisted roots which were presumed, from their appearance, to be mycotrophic. Examination showed the plant to be monoecious with actinomorphic, unisexual flowers, each with six strongly reflexed petals (FIG. 1, C & D), each tipped with a beard of abundant, mar-

* This field work was supported by the National Science Foundation (Grant GB-1545) for which grateful acknowledgment is expressed.

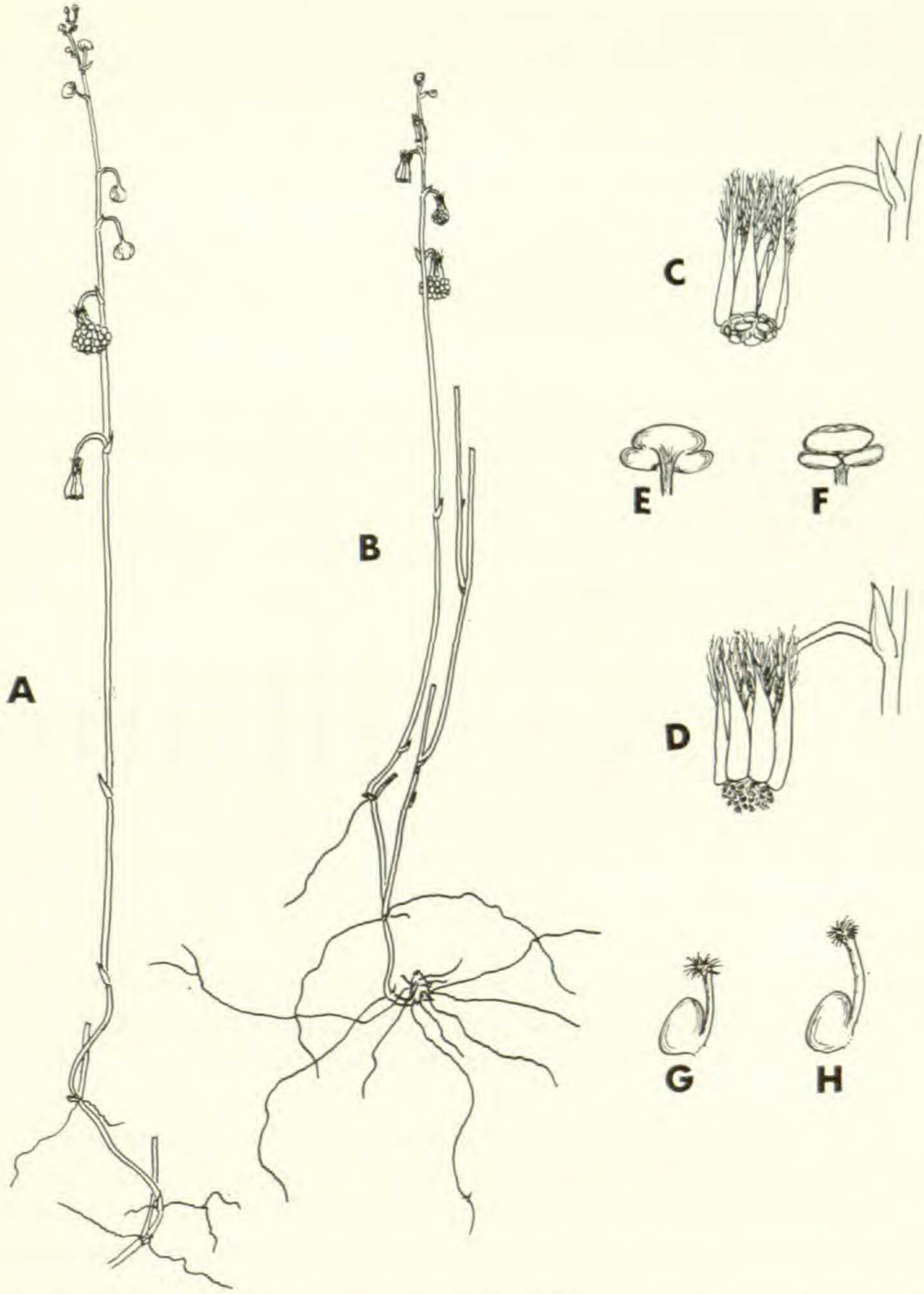



FIGURE 1. *Sciaphila dolichostyla.* A & B, habit, natural size; C, male flower, × 5; D, female flower, × 5; E & F, anterior and posterior view of stamen, × 20; G & H, single ovaries, × 25.

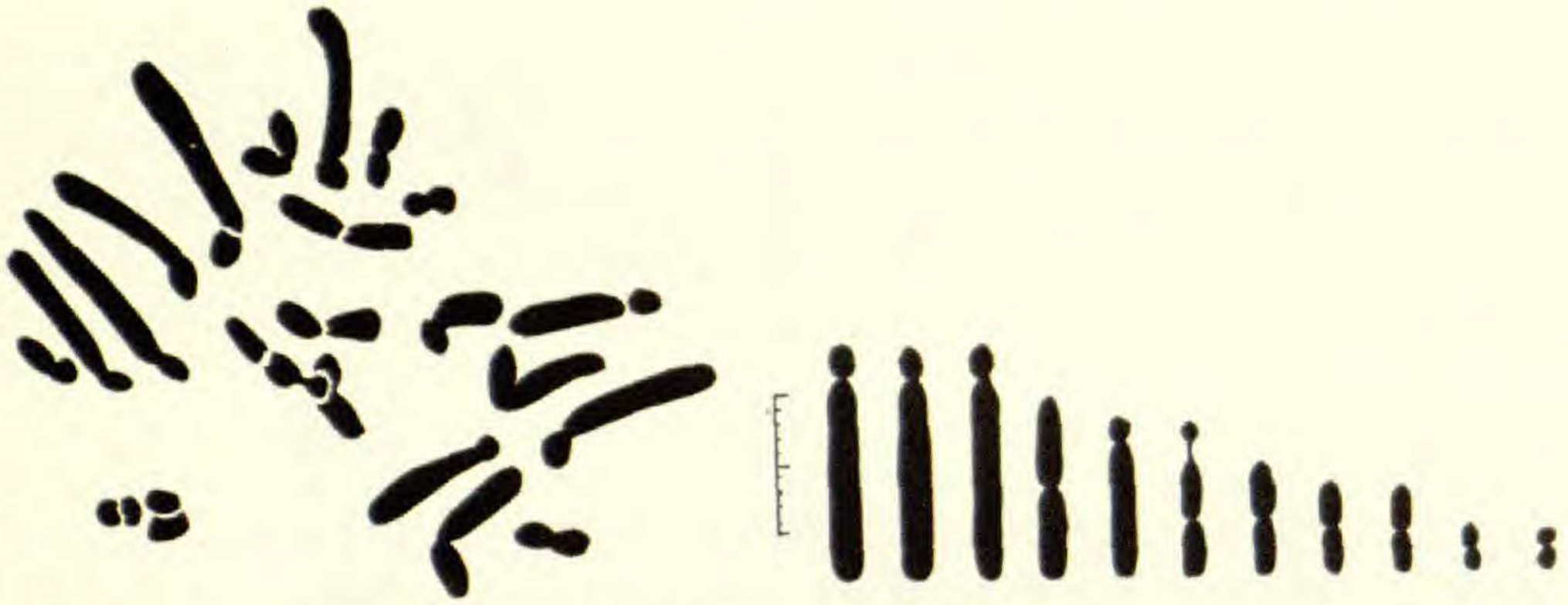
ginally borne, pale purplish hairs. The pedicels were arcuate and somewhat secund, as originally described by Schlechter (1907, p. 19).

The male flowers clearly possessed six stamens (FIG. 1, C) in contrast to the condition in the only other species of *Sciaphila* described from New Caledonia, *S. neo-caledonica* Schltr. which has three. The stamens each had three pollen sacs and were borne on distinct filaments about one-fourth millimeter long (FIG. 1, E & F).

In the female flowers (FIG. 1, D) the numerous ovaries, each capable of producing a single seed, were carried on a rounded receptacle and each

possessed a simple basal style with stigmatic tuft (FIG. 1, G & H). The length of the style, to which allusion is made in the specific epithet, varied somewhat, perhaps depending upon the maturity of the flower, from about 0.3 to 0.5 millimeter in length.

The gametic complement was found to consist of 22 chromosomes, three of which were large, six medium and two small and which varied in length from approximately 17 to approximately 3 micra. All the large chromosomes were subterminal, while the smaller, and most of the intermediate sized ones, were median (FIGS. 2 & 3).



FIGURES 2 and 3. *Sciaphila dolichostyla.* LEFT, FIG. 2. Chromosomes at prometaphase, × approximately 1,000. RIGHT, FIG. 3. Idiogram of gametic complement of chromosomes in *Sciaphila dolichostyla.*

The first of two previous chromosome counts recorded for the family Triuridaceae was that of $2n = 48$ by Ohga and Sinoto (1924) for *Sciaphila japonica* Makino; but in his monograph of the family, this species was transferred by Giesen (1938) to the genus *Andruris.* Furthermore, and two years earlier, Nakai and Maekawa (1936) had proposed a somewhat doubtful segregate genus *Parexuris,* to contain this species and *Sciaphila tosaensis* Makino, a genus not accepted by Geisen. It would seem that *Andruris* may have 12 as its basic chromosome number, and Ohga and Sinoto suggest that *Andruris japonica* (as *Sciaphila japonica*) may be a tetraploid. They also record a karyotype of large and small chromosomes with two large, two intermediate in size and 20 small chromosomes in the gametic complement. The report of a count of $n =$ about 12, for a *Sciaphila* sp. by Wirz (1910) is also recorded by them, but while he deals at length with the developmental embryogeny of a plant from Java, said to be near *Sciaphila andajensis* (that is *Andruris andajensis*), there is no actual publication of a chromosome number.

More recently Larsen (1963) has investigated the karyotype of a new species of *Sciaphila* he described from Siam, *S. thaidanica* Larsen. Unlike *S. dolichostyla* and *Andruris japonica* the chromosomes were all found to be about the same size and, what is more, the haploid number was 14, a different base number than either of the other two species. However, with its three stamens and other distinguishing characters it belongs to Sect.

OLIGANTHERA Schltr. rather than Sect. HEXANTHERA Schltr., of which *S. dolichostyla* is a member.

Karyotypes of large and small chromosomes, such as those recorded here, and by Ohga and Sinoto, are also known in the Butomaceae and the Hydrocharitaceae, although in these families the differences between the large and small chromosomes appear more marked. Basic numbers of 11 (as in *Sciaphila dolichostyla*), 12 (as in *Andruris japonica*) and 14 (as in *Sciaphila thaidanica*) have all been recorded for the Hydrocharitaceae and Alismataceae, while 11 has also been recorded for the Scheuchzeriaceae (*Scheuchzeria*) and one genus of the Butomaceae (*Tenagocharis*). All of these are families with which the Triuridaceae has been associated in the classifications of Hutchinson, Engler, and Bentham and Hooker.

## LITERATURE CITED

GIESEN, H. 1938. Triuridaceae, *in*: ENGLER ed. Pflanzenreich, IV. **18** (Heft 104): 1–84.

LARSEN, K. 1963. Studies in the flora of Thailand, 14. Cytological studies in vascular plants of Thailand. Dansk Bot. Ark. **20:** 211–275. [*Sciaphila*, p. 249.]

NAKAI, T., & F. MAEKAWA. 1936. *Parexuris*. Nakai, Icon. Pl. Asiae Orient. **1:** 23. *t.11*.

OHGA, I., & Y. SINOTO. 1924. Cytological Studies on *Sciaphila japonica*, I. On Chromosome. Bot. Mag. Tokyo **38:** 202–207.

SCHLECHTER, R. 1907. Beiträge zur Kenntnis der Flora von Neu-Kaledonien. Bot. Jahrb. **39:** 1–274. 1907. [*Sciaphila*, p. 19.]

WIRZ, H. 1910. Beiträge zur Entwicklungsgeschichte von *Sciaphila* spec. und von *Epirrhizanthus elongata* Bl. Flora **101:** 395–446. [*Sciaphila*, p. 418–446.]

ARNOLD ARBORETUM
HARVARD UNIVERSITY
AND
GRAY HERBARIUM
HARVARD UNIVERSITY

Present address (for P.S.G.):
ROYAL BOTANIC GARDENS
KEW, RICHMOND, SURREY
GREAT BRITAIN